

“Air Attack”

Overcoming “Victory on the Battlefield” in the Pursuit of Jointness for Army Air and Missile Defense

**A Monograph
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ABSTRACT

“Air Attack” Overcoming “Victory on the Battlefield” in the Pursuit of Jointness for Army Air and Missile Defense by LTC Forrest E. Smith, USA, 61 pages.

Operation Desert Storm was fought with an immature counter-TBM weapons system, without joint or service AMD doctrine, and without the benefit of joint training. Twelve years later Army AMD forces took to the battlefield once again as part of a joint and coalition force, this time exercising within a JTAMD architecture, possessing a significantly enhanced PAC-3 missile capability, utilizing an evolving doctrine and benefiting from limited joint training. Despite the successful engagements of nine of nine inbound TBM missiles, there were two fratricide aircraft engagements, and one Air Force engagement of a US Patriot unit. Successful execution of an Early Warning net, the establishment of the Tactical Information Datalink (TADIL), and the successful integration of coalition forces, specifically Kuwaiti forces, into the JTAMD architecture were largely the result of intensive training exercises, and the implementation of a combined Operational Readiness Evaluation (ORE) team specific to that region, and focused on the specific threat associated with Iraq and its WMD capability.

The purpose of this paper was to investigate the “success” of Army AMD as part of a JTAMD system in order to determine to what degree “jointness” was successful, and whether this success was the result of a focused effort, specific to this region, or truly representative of a joint approach to develop a Joint TAMD capability. An assessment of the Army AMD as an element of the JTAMD served to reveal issues specific to a service component as it related to the joint system and further necessitated an appreciation for the interaction of numerous variables within a complex environment. Dietrich Doerner’s model for understanding complex systems served as useful framework in assessing the Army AMD system.

My conclusion is that “jointness” remains little understood. I have also concluded that primacy of technological research and development efforts during the 12 years between Operation Desert Storm and OIF resulted in a disjointed effort to field technological improvements, train soldier proficiency on new systems’ capabilities, train successfully as a part of a JTAMD architecture, and meet the demands of increasingly demanding world-wide Patriot missions. Additionally, I have concluded that the absence of a centralized training and evaluation process within the Army AMD itself or the JTAMD in general, combined with a bifurcated organizational structures at Ft Bliss contributed to a gradual degradation of training proficiency and subordination of training itself as a resource priority. This was reflected in wide disparities in crew proficiency and an inability to resolve the decade old problem of airspace management. The effort to achieve “jointness” is further impeded due to the lack of a joint forcing function and the contradicting demands for “seamless interdependence” within a system that resources funding along service lines.

My conclusions resulted in three recommendations for the Army AMD community. First, a new model is necessary that defines training mastery and leadership development as resource priorities over technological development. This model must also emphasize management of change, and the development of adaptive learning processes as part of a robust, centralized training framework. At the same time, a centralized organization is needed, which, comprised of masters of JTAMD and tasked with validating core competency standards, is entrusted with managing the tactical readiness of the branch as a whole. In lieu of a structured joint training architecture similar to the NATO model, this organization will serve admirably in ensuring crew proficiency in depth and breadth, across the branch. Finally, consideration needs to be given to eliminating the bifurcated organizational structures and relationships at Ft Bliss in order to facilitate a unified effort in addressing JTAMD shortcomings, and in the development joint capabilities.

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INTRODUCTION

A cannonball behaves ballistically. Once we have fired it, we have no further influence over it. The course it takes is determined entirely by the laws of physics. This is not true of a rocket, which...is subject to the control of a pilot, or the remote control of a pilot...who can alter its flight of path...Because our grasp of reality can only be partial, we have to be able to adjust the course of our actions after we have launched them; analyzing the consequences of our behavior is crucial for making these ex post facto adjustments.¹

Dietrich Doerner, The Logic of Failure

STATEMENT OF THE PROBLEM

This monograph represents an attempt to analyze the consequences of actions taken within the Joint Theater Air and Missile Defense, (JTAMD) community between the end of Operation Desert Storm and the conclusion of Operation Iraqi Freedom. It represents an effort to understand from a single service perspective, the complexities associated with fielding a counter Theater Ballistic Missile (TBM) capability as part of a larger Joint counter-TBM capability within the JTAMD system. While the Army is only one element of the JTAMD system, its successes and challenges contribute directly to the successes and challenges experienced by the JTAMD system. In fact, the success of the larger system is directly dependent on the success of the individual services TMD systems and their successful incorporation into the larger JTAMD system. Looking through the lens of one service component reveals more than the challenges within that service in striving to develop Joint capabilities. This perspective also reflects aspects of the larger Joint system and how that system resources, trains and executes service capabilities to achieve synergistic effects. This monograph seeks to understand the complex environment that existed within the Army AMD community in order to more fully appreciate the performance and challenges of JTAMD during OIF.

The evolution of the JTAMD mission represents a transformation in concepts and capabilities with strategic implications and reflects challenges that can be expected when existing

¹ Dietrich Doerner, *The Logic of Failure*, New York Metropolitan Books, 1989, 178

complex systems are faced with rapidly evolving technical and materiel capabilities. When faced with the demand to accommodate accelerated research, development, testing and fielding, the natural competition for resources is significantly affected, ultimately altering efforts across the service domains of doctrine, organization, training, materiel development and leader education (DOTML). This environment is made even more complex when a single service is required to sustain exceptional operations tempo (OPTEMPO), while tasked to develop a capability with inherently Joint implications, while constrained by resource funding along a single service line.

Analysis of the complex environment within which the JTAMD mission evolved should result in an appreciation for the interaction of key variables and the need to view complex environments from a system of systems perspective. The application of key principles of Dietrich Doerner's theory on failure as presented in his book, *The Logic of Failure*, serve as a framework for analyzing the complex JTAMD environment. These principles reinforce key concepts, specifically, the need for clarity in goal setting, and the importance of developing "structural knowledge" in the understanding of reciprocal interactions among variables, especially as they relate to anticipating second and third order effects of decisions. This monograph will ultimately present recommendations that are consistent with Doerner's principles for managing complexity, specifically an emphasis upon modeling, simulation, and the incorporation of expert observers, which should prove instructive in determining strategies necessary to adjust and shape future efforts in the pursuit of a Joint interdependent counter-TBM capability

BACKGROUND

Efforts to develop Theater Missile Defense (TMD) capabilities during the past decade have resulted in tremendous improvements among the various service communities in the ability to counter TBM threats. The capabilities demonstrated by the JTAMD community during Operation Iraqi Freedom (OIF) present numerous examples of significant effects that Joint synergy can produce when various service capabilities are synchronized on the battlefield.

However, a critical assessment of JTAMD performance during OIF also reveals some disturbing aspects of dis-Jointedness among the services in the pursuit of JTAMD capabilities and in addressing lessons learned during Operation Desert Storm. Despite a decade of “rehearsals of concept” (ROC) drills in a single theater, and despite technical advances which ensured a more lethal counter-TBM capability within the Army, the JTAMD community remained mired in service parochial plodding towards attaining limited degrees of Jointness. Despite the demonstration of an unprecedented counter-TBM capability, success during OIF endured an inability to prevent several incidences of fratricide. The United Kingdom’s Royal Air Force Board of Inquiry determined contributory factors to the fratricide of a British Tornado, shot down by a Patriot PAC-3 missile on 22 March 2003. Contributory factors included: “Patriot Anti-Radiation Missile Rules of Engagement; Patriot Firing Doctrine and crew training; Autonomous Patriot battery operations; Patriot IFF procedures, aircraft routing and airspace control measures and Orders and Instructions.”² Though complex and challenging, these factors represent fundamental procedures necessary to execute the JTAMD mission.

Despite overwhelming, decisive victory during Operation Desert Storm, the less than favorable assessment of the Patriot missile system revealed sensitive strategic and operational vulnerabilities for the JTAMD (JTAMD) system. These vulnerabilities prompted an aggressive pursuit of technological research and development over the next decade in an effort to successfully counter the various evolving TBM threats.

A decade dedicated to aggressive technological research and development produced some significant counter-TBM capabilities. Among the more evident technological advances were the PAC-3 missile hit-to-kill capability, the Aegis radar and early warning capability, and the ability to provide a functioning command and control structure sharing distributed air pictures among various air defense platforms, via the Joint Tactical Data Information Link (TADIL). While each

² U.K., Ministry of Defense, “Military Aircraft Accident Summary, Aircraft Accident to Royal Air Force Tornado GR MK4A ZG710”, (May 2004): 3.

service was able to demonstrate significant advances in technological capabilities, far surpassing those demonstrated during Operation Desert Storm, significant challenges still existed when it came to synchronizing technological capability with the conduct of combat operations.

Despite a decade of training exercises, rehearsals and familiarization with the challenges specific to the CENTCOM area of operations the difficulties experienced in integrating significant advances in technological capabilities during OIF, hints at the possibility that successful JTAMD operations may be due less to Joint community efforts to develop “Jointness” and more to the heroics of air and missile defenders in developing ad hoc solutions to integrating service systems possessing Joint capabilities. JTAMD mission success may be more a reflection of, the extensive presence of those air and missile defense systems in the CENTCOM area of responsibility (AOR) and the focused attention on operations and the threat in that specific AOR over the better part of the last decade, and less on the cumulative, Joint synergistic efforts by the Joint community to produce a truly Joint TAMD capability. It remains to be seen if the JTAMD community could have produced the same degree of Joint success had operations been conducted in a different regional area of operations, or for that matter, had combat operations progressed longer in OIF itself. The assessment of the United Kingdom’s Ministry of Defense in this accident report reflects similar comments within several OIF lessons learned documents and hint that solutions to these problems lie beyond the perimeter of the tactical fire unit, ultimately reflecting that the JTAMD community continues to fall far short of attaining anything resembling a seamless Joint TBM defense capability. If OIF reflects anything in terms of Jointness, it is not that we trained as we fought, but in fact, how we fought reflected how we trained.

METHODOLOGY AND ANALYSIS

“...the ability to make allowances for incomplete and incorrect information and hypotheses is an important requirement for dealing with complex situations. This ability does not come naturally however. One must learn to cultivate it.”³

Dietrich Doerner, The Logic of Failure

Dietrich Doerner’s *The Logic of Failure* serves as a good framework for studying the complexities associated with the pursuit of “Jointness” as it applies to the JTAMD community. Doerner’s study is less about predicting failure than about understanding the factors which contribute to failure. In Doerner’s words, “Failure does not strike like a bolt from the blue; it develops gradually according to its own logic...complicated situations seem to elicit habits of thought that set failure in motion from the beginning...the continuing complexity of the task and the growing apprehension of failure encourage methods of decision making that make failure even more likely and then inevitable.”⁴

It is not the intent of this monograph to imply that Army efforts to achieve JTAMD capabilities represent “failure,” or that failure of the JTAMD system would have resulted had the war in Iraq progressed beyond conclusion of major combat operations. However, apprehension of failure tends to influence methods by which strategies are developed, and may influence near term solutions that might result in unanticipated long term risk. An assessment of Army efforts at developing Joint capabilities over the past decade may reveal characteristics which serve to account for some of the challenges experienced during OIF by Army AMD in particular and JTAMD in general.

JTAMD is an exceptionally complex system influenced by numerous interdependent variables, and as such it represents an excellent case study for other systems pursuing Jointness. This monograph will utilize Doerner’s theories on complexity, the need for clear goal setting, the

³ Doerner, 52

⁴ Ibid, 10

importance of utilizing a system of systems approach through an understanding of “reciprocal interactions” of interdependent variables and the importance of incorporating simulations and expert observers in training to operate within complex systems. I will begin by reviewing the various definitions for “Jointness”, Joint interoperability and Joint interdependence as well as specific “Joint” guidance in an effort to evaluate the degree of clarity associated with goal setting where the objective is “Jointness”. Doerner emphasizes the importance clear goal setting and in particular the significance of distinguishing between positive and negative goals and general and specific goals and the impact on processes associated with the pursuit of those goals. It appears that expectations associated with Jointness may be misunderstood as it relates to the use the various terms in reference material and post-conflict assessments. I will also attempt to determine who sets Joint goals and what authority if any, they have to enforce Joint goals. There is a clear disparity between Joint goals referenced in official sources and Department of Defense funding procedures, which remain disbursed along service oriented lines. This framework and the process of disbursing resource funds along service lines with the expectation of achieving Joint capabilities contributes significantly as a source of friction and lack of clarity in the pursuit of Jointness.

I will also investigate “reciprocal interactions” of key interdependent variables, focusing on the interrelationship of the elements of doctrine, organization, training, leadership education and the apparent disproportionate attention given to pursuing materiel or technological capabilities. The challenges associated with accommodating rapid technological advances within a single service beset by the tremendous OPTEMPO requirements, personnel stability issues within units, and geographical dispersion around the globe, are daunting. Add to this environment unrealistic expectations of “seamless” Joint interdependence within a Department of Defense system that reinforces service parochial protectionism vice the pursuit of Jointness and the complexity becomes increasingly frustrating and unclear.

Finally, I will apply Doerner's concepts in an attempt to develop proposals for adjusting the Army Air and Missile Defense efforts to effectively contribute to the JTAMD mission. While JTAMD performance in OIF represents an unprecedented leap forward in counter-TBM capability from that demonstrated during Operation Desert Storm, the challenge remains to determine whether greater progress is in order and if so how to get at developing and synchronizing those capabilities within the Joint environment. Doerner recommends extensive emphasis on incorporating simulations as well as the reliance on expert observers in developing as effective method of training for complexity. Incorporating aggressive simulations play with expert observers will reinforce proficiency, agility and acuity at all levels necessary to execute within the JTAMD system, as well as reinforce training to anticipate complex challenges associated with the modern battlefield. At a glance, this sounds like a fundamental, logical conclusion. However, only recently have Joint simulation exercises begun to replicate the Joint battlefield, and all of its challenges, within an established operational framework with universally understood TTPs, which simultaneously train and rehearse subordinate tactical units. Despite progress in this area current Joint training simply lacks the necessary frequency and depth necessary to train to proficiency, all of the service participants in the JTAMD system. Additionally, I believe there is a need to incorporate an aggressive Joint evaluative process to assess the proficiency of all elements of the JTAMD system.

Efforts to develop methods to manage systems within the complex JTAMD system requires a fundamental appreciation for the complex environment within which JTAMD has evolved. As Dietrich Doerner notes however, efforts to adjust the course of our actions result from only a partial grasp of the reality of the complex environment. This suggests an expectation that managing complexity involves continuous assessment and reassessment, successive adjustments, and a willingness, indeed an expectation that progress not only involves change, but is in fact, a matter of developing systems emphasizing continual assessment processes, designed to anticipate, accommodate and manage "change" itself.

THE NEED FOR CLEAR GOALS

“If we want to deal rationally with a complex problem, the first thing we do (tentatively at least) is define our goals clearly.”⁵

Dietrich Doerner, The Logic Of Failure

Perhaps the single most important requirement in complex organizations in general and the military in particular is the need to clearly identify goals. Doerner emphasizes the need to set clearly understood goals, or rather to avoid unclear goals emphasizing that, “unclear goals are ones that lack a criterion by which we can decide with certainty whether the goal has been achieved.”⁶ Strategies to deal with unclear goal setting in complex concepts involve deconstructing goals, studying the interdependencies, and attempting to identify and isolate central problems that bear on a number of peripheral problems. This process typically leads to the discovery of a multifaceted problem or more problems or goals to be dealt with. Difficulty in distinguishing between central problems and peripheral problems can be dealt with in several ways and Doerner presents three strategies for dealing with this. If it becomes impossible to distinguish between central problems and peripheral problems then Doerner suggests ranking problems in order of importance or urgency. A second strategy involves delegating, cautioning that delegation requires commissioning other institutions or persons to do detailed work while remaining conscious of the role the delegated problem has in the overall problem.”⁷ Doerner also suggests a strategy for dealing with resulting multiple goals when they conflict, suggesting that multiple goals conflict because variables relating to them are negatively linked. He suggests reshaping the entire system in such a way that the negative relationships within the system disappear. As an example, a central theme in this monograph is that the targeting the “inevitable human element” and the pursuit of technological research and development represent conflicting

⁵ Ibid, 153

⁶ Ibid, 50-51

⁷ Ibid, 56

goals. I propose that the human element should retain priority of focus, but that proposals to incorporate stringent crew proficiency assessments should be linked with the steps of technological system improvements, and that training strategies that don't involve a centralized process of validating crew proficiency consistent with technological advances will result in compromising the systems intended objective capabilities. At issue, and addressed within this monograph, is the efficacy of this process, the process by which crew proficiency is linked to incremental technological advances, and how that crew proficiency is measured and sustained.

Assessment of the reciprocal interactions of variables within the JTAMD and Army AMD systems it is important to understand Doerner's emphasis on the importance of understanding the relationship between goal criteria. Complex systems, by their nature involve multiple goals due to the interaction of numerous variables, some understood and some not readily apparent. An attempt to understand the difficulties associated with pursuing JTAMD capabilities requires an understanding of the goals being pursued as well as an appreciation for the relationship of the interdependent variables that influence those goals. As Doerner points out,

"...the fact that most people's actions are driven by an excessive preoccupation with explicit goals accounts for a great deal of bad planning and counterproductive behavior. People concern themselves with the problems they have, not the ones they don't have (yet). Consequently , they tend to overlook the possibility that solving a problem in area A may create one in area B."⁸

These dynamics are especially apparent within the Joint community in general, and the Army AMD community in particular, due to the exceptionally complex environment associated with inherent Jointness. It is apparent that Jointness in general, represents a somewhat unclear goal, subject to interpretation, as evidenced by various assessments as to the degree of Jointness achieved in past conflicts.

Transformation goals seem to reflect that the pursuit of Joint interoperability has been replaced by a desire to achieve Joint interdependence, though there remains some confusion as to

⁸Ibid, 52

exactly what specifically distinguishes one term from the other. Another point of friction where Army transformation and Army AMD transformation are concerned, is the general Army transformation goal to develop more modular forces with increased capability for mobility, and maneuverability in contrast to Army AMD weapons systems which continue to demonstrate significant maneuverability and mobility limitations. Additionally, Army AMD point defense capability is not yet designed to defend highly maneuverable modular forces as they maneuver across the battlefield. The Army's AMD capability is focused on providing a theater defense capability for priority operational assets and functions within the framework of a Joint system, the JTAMD system. As a result, Army AMD is forced to compete for resources necessary to develop Joint capabilities within a framework which allocates resources through service channels and dispenses those resources in accordance with service priorities which may or may not coincide with efforts to achieve Joint capabilities, or in this case, Joint interdependence. The bottom line is pursuit of the stated goal of Joint interdependency within a system that allocates resources via service lines represents a conflict of interests, a point of friction, and a source of unclear goal setting.

While significant technological advancements continue to facilitate improvements in Joint interoperability, equally significant technological challenges continue to inhibit the realization of fully synergistic Joint effects, making the attainment of "Joint interdependence" increasingly more challenging, and making "seamless Joint interdependence" perhaps an unrealistic as well as unclear goal. It is also apparent that regardless of Joint capabilities deployed, Joint servicemen and women are still forced to implement ad hoc solutions in order to capitalize on resident Joint capabilities. This is a reflection on the lack of Joint training conducted prior to unit deployments. Whether the limited Joint training is a function of resource limitations or lack of command emphasis remains a matter of perspective, but as we will see there is an apparent lack of appreciation for depth and frequency of Joint training to develop Joint capabilities. The inevitable human element remains the one common denominator in the

challenges above and in all of the elements of the DOTML domains. Strategies designed to develop Joint capabilities must enforce methods to maintain that focus, orienting all training and evaluation efforts across the DOTMLPF domains emphasizing service-member comprehension, proficiency, and compliance.

IN PURSUIT OF “JOINTNESS”

“Jointness defies consistent definition. The Goldwater-Nichols Act, the Chairman of the Joint Chiefs of Staff, the Senate Armed Services Committee, and students of operational art all view Jointness differently.”

*Seth Cropsley, The Limits of Jointness*⁹

How well is Jointness understood and to what degree has the military been successful in accomplishing Jointness during the period after the Goldwater-Nichols Act of 1986? In the case of Operation Desert Storm, assessments vary as to the degree of success, and the level of Jointness achieved. In *The Limits of Jointness*, printed in Joint Force Quarterly shortly after the completion of Operation Desert Storm, Seth Cropsley reflected that, “Joint Pub 1 paints General Schwartzkopf’s victory over Iraq as a jewel in the Joint crown. It quotes repeatedly and at length from all his component commanders on the virtue of harmony.”¹⁰ MG Robert Scales highlighting Joint accomplishments during Operation Desert Storm noted,

“Problems with procedure and philosophy, however should not diminish the fact that in Desert Storm the United States raised the execution of Joint warfare to an unprecedented level of competence.”¹¹

On the other hand, contentious disagreements between the Army and Air Force over the control of operations with respect to the Fire Support Coordination Line (FSCL) and the conduct

⁹ Ibid, 42

¹⁰ Seth Cropsley “The Limits of Jointness,” *Joint Forces Quarterly*, (Summer 1993); 77

¹¹ Robert H. Scales, *Certain Victory: The U.S. Army in the Gulf War*.” Office of the Chief of Staff, United States Army. Washington, D.C.,1993; 370

of Joint Fires, are well documented and seem to reflect fault lines in Jointness. A separate interpretation by Douglas MacGregor concluded,

“Victory in the Persian Gulf led senior leaders to insist that ground and air operations against Iraq were Joint. In reality there was little evidence for such a claim. Even though the Commander in Chief, Central Command prescribed a chain of command and organized Joint forces, operations largely conformed to WWII. Single service warfighting organizations waged Desert Storm with only broad strategic guidance. Therefore it is not surprising that the services sought to exploit success to validate their doctrine, organization, and equipment.”¹²

Subsequent operations in the Balkans also drew mixed reviews with respect to the level of Jointness achieved. Operation Allied Force, the engagement in Kosovo, has been described as “the low point of Jointness”¹³ Critics cite the failure to appoint a Land Component Commander, an unwillingness by the Army to allow helicopters to be tasked as part of the Air Tasking Order (ATO), or to capitalize on Joint Suppression of Enemy Air Defense (J-SEAD) capability that the Air Force presented, relying instead on its own MLRS assets. Additionally, the performance of Joint Stars against dispersed and hidden enemy forces was less than satisfactory leading another critic to note, “surprisingly little progress was registered by the Air Force over the nine years since Desert Storm in developing a concept of operations for using Joint Stars in surveillance and control teams that also includes AWACS, Rivet Joint, airborne FACs and UAV, all working as a synergistic collective against elusive enemy ground forces.”¹⁴ The apparent lack of Jointness experienced during operations in Kosovo prompted a former Chief of the Joint Doctrine Division

¹² Douglas A MacGregor, “The Joint Force, A Decade No Progress”, *Joint Forces Quarterly*, (Winter 2000-2001); 19

¹³ Bernard Rostker, “Transformation and the Unfinished Business of Jointness: Lessons Learned for the Army from The Persian Gulf, Kosovo, and Afghanistan; 138

¹⁴ Benjamin S Lambet, *NATO’s Air War for Kosovo: A Strategic and Operational Assessment*, Santa Monica, Calif, RAND, MR-1365-AF, 2001, 123

of the Joint Staff, Colonel Bob Gaskin, to describe operations as, “inconsistent with Joint doctrine in both word and spirit.”¹⁵

Initial operations during Operation Enduring Freedom (OEF), involving special operations forces (SOF) teams and Air Force assets exposed still more fault lines in Jointness. Operation ANACONDA, “demonstrated a continuing requirement for organic immediate suppressive fires that, despite their best efforts, fighters could not deliver.”¹⁶ Some problems were attributable to inflexibility of the Air Force’s 72 hour ATO cycle. However after “spirited debates...air planners cut their traditional 72 hours targeting cycle to as little as 12 hours. For still greater flexibility , they divided the country into 30 “kill boxes” in which pilots could loiter, waiting to be given targets.”¹⁷ The ability of SOF teams and Air Force planners to develop workarounds resulted in tactics, techniques and procedures, which ultimately contributed to the stunning victory over the Taliban.

Each of the conflicts identified above culminated in victories for U.S. forces. Yet there are clear trends in each conflict and period in between conflicts which reflect a dis-Jointed approach to identifying Joint problems, developing Joint solutions and implementing those Joint solutions. Despite the clear identification of apparent Joint fault-lines, and the successful development and application of new TTPs to address those fault lines, several apparent fault line issues were not successfully resolved in post-conflict analysis and continued to reappear in one form or another subsequent future conflicts.

Despite a decade of Joint training and evolving Joint doctrine, the management of Joint Fires, as well as the conflict over FSCL management still remained sources of dissention during Operation Iraqi Freedom. Each conflict above required the resourcefulness of U.S. forces from

¹⁵ David Atkinson and Hunter Keeter, “Apache Role in Kosovo Illustrates Cracks in Joint Doctrine”, *Defense Daily*, Vol 202, No. 40, May 26, 1999, 138

¹⁶Gregory Fontenot, E.J. Degen and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom*, Kansas: Combat Studies Institute Press, 2004, 25

¹⁷ Dana Priest, “Team 555 Shaped a New Way of War: Special Forces and Smart Bombs Turned Tide and Routed Taliban,” *Washington Post*, April 3, 2002, A1

different services to effect ad-hoc solutions to apparent fault lines in Jointness. In most cases the ad-hoc solutions were developed under combat conditions, or immediately prior to the commencement of combat operations. Taken together, these conflicts indicate clearly that seams persist despite apparent efforts to achieve Jointness. The first step in addressing fault-line issues such as those above is to acknowledge that in fact, they exist. The persistence of similar challenges over several conflicts hints at the degree of service parochialism that still exists, as well the possible lack of a centralized Joint oversight apparatus capable of decisively intervening to resolve these issues. The failure to exercise a decisive Joint oversight apparatus serves to reinforce stovepipe approaches in the development of service capabilities, exposes seams in Jointness, and inhibits resolution of Joint fault line issues while effectively paying lip service to goals associated with achieving “Jointness”. This takes on increasing significance when the service you perform resides in one branch of the service while your primary mission is oriented on achieving “seamless Joint interdependence”.

JOINTNESS

The Secretary of Defense describes “Jointness” as, “the ability of the different branches of our military to communicate and coordinate their efforts on the battlefield.”¹⁸ Seth Cropsey notes in his article, *The Limits of Jointness*, “it is important to be as clear as possible about what Jointness is and what it is not. Failure to do so is likely to lead to an erosion of the distinctive abilities of the military disciplines from those whose differences-ironically-the rationale for Jointness originally springs.”¹⁹ MG Robert Scales noted in his assessment of Joint operations in Operations Desert Storm,

“In years to come, the single most distinguishable characteristic of Joint land combat will be the presence of aerial vehicles from every Service and in support of every battlefield function.

¹⁸ Donald Rumsfeld, “Tomorrow’s Armed Forces”, *Foreign Affairs*, (May/June 2002); 31

¹⁹ Cropsey, 72

It is essential that all aerial and ground platforms, regardless of the service of origin, be blended together in an effective, seamless, striking force.”

Yet another perspective is offered by Lawrence Wilkerson in his article, *What is Jointness?* He counters that, “Jointness is *not* seamless. It will have as many seams as the fallibility of human nature and technology impose.”²⁰ Wilkerson’s interpretation seems to reflect the circumstances leading up to JTAMD operations in OIF. Human nature and technological limitations tend to inhibit seamlessness, especially in an exceptionally complex system such as JTAMD. Yet we still refer to both terms, Jointness and seamless, as goals, one term seeming to possess multiple interpretations and the other exceeding realistic expectations.

JOINT INTEROPERABILITY

Joint Vision 2020 cites Joint Pub 1-02 and defines interoperability as, “the ability of systems, units, or forces to provide services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together.”²¹

General William Kernan, Commander in Chief of Joint Forces Command (JFCOM), in 2002 described JFCOM’s role before the Senate Armed Services Committee,

“as the chief advocate for Jointness, Joint Forces Command identifies, collects, categorizes and prioritizes warfighting interoperability requirements critical to the Combatant Commanders...and also synchronizes JROC endorsed DOTMLPF solutions to interoperability and integration shortfalls...”²²

CJCSI 3170.01D, the Joint Capabilities Integration and Development System manual defines Joint interoperability as,

“The ability of systems, units or forces to provide data, information, materiel and services to and accept the same from other systems, units or forces and to use the data, information and

²⁰ Lawrence B. Wilkerson, “What Exactly is Jointness?” *Joint Forces Quarterly* (Summer 1997) 66

²¹ “Joint Vision 2020, America’s Military-Preparing for Tomorrow”, *Joint Forces Quarterly*, (Summer 2000), 65

²² William F. Kernan, “Statement of William F. Kernan, U.S. Army Commander in Chief United States Joint Forces Command before the Armed Services Committee United States Senate”, (9 April 2002)

services so exchanged to enable them to operate effectively together. IT and NSS interoperability includes both the technical exchange of information and the end-to-end operational effectiveness of that exchanged information as required for mission accomplishment.”²³

Lawrence Wilkerson in *What Exactly is Jointness?* reinforces the importance of Joint interoperability in the following manner,

“Of all the misunderstood and misidentified components of Jointness, interoperability is the most important. It is the technical side of trust. Without it trust evaporates quickly in the heat of combat.”²⁴

Joint interoperability seems to refer to the need to develop complimentary and redundant, interservice capabilities and to be able to exchange those capabilities among each of the services. It is fairly straightforward and seems useful as broad guidance. However, Joint interoperability is increasingly, often confused with another term, “Joint interdependence.” Is there a difference and if so, is that difference clear?

JOINT INTERDEPENDENCE

Joint Vision 2020 addresses *Joint interdependence* in describing its vision. “The overarching focus of this vision is full spectrum dominance-achieved through the *interdependent application* of dominant maneuver, precision engagement, focused logistics and full dimensional protection.”²⁵

The Chief of Staff of the Army, (CSA), refers to *Joint interdependence* in articulating strategic rationale for Joint and future services in the Army’s Fiscal Year 2005 Gameplan stating,

“Our *mindset* must be one of *Joint Interdependence*-by ensuring that service core competencies are fully complimentary. We must continue to work to move *beyond traditional*

²³ U.S. Department of Defense, “Chairman of the Joint Chiefs of Staff Instruction, CJCSI 3170.01D, Joint Capabilities Integration and Development System,” Washington, D.C.: U.S. Government Printing Office. (12 March 2004), GL-7

²⁴ Wilkerson, 67

²⁵ Joint Vision 2020, 59

notions of interoperability or integration-preserving essential redundancies while minimizing vulnerabilities-in order to dominate across the range of military operations.”²⁶

The document further identifies specific “*interdependent capabilities*” in which *Joint interdependence* should be developed, (Joint Fires, Joint Battle Command, Joint Force Projection, Joint Air and Missile Defense, and Joint Logistics).

JP 3-01.5, Doctrine for Joint Theater Missile Defense refers to the, “*integration of Joint force capabilities* to destroy enemy theater missiles in flight or prior to launch or to otherwise disrupt the enemy’s theater missile operations through an *appropriate mix of mutually supportive* passive missile defense, active missile defense, attack operations and supporting command, control, communications, computers and intelligence measures.”²⁷ At the same time, The Army AMD Mission statement refers to AMD forces, “fighting *interdependently* with other elements of the JIM team at strategic, operational and tactical levels...”²⁸ Major General Michael Vane, Commanding General for the Air Defense Artillery articulates this further in stating,

“Analysis of the National Security Strategy, transformation guidance and various lessons learned reveals that AMD must provide four essential functions or missions to the Joint commander: the capability to kill CMs, UAV, TBMs, and RAM before they can affect the Joint commander’s ability to seize terrain, people, and resources; situational awareness and understanding of the third dimension linked to all of the capabilities from all of the services...contribute to the control of air-space in conjunction with Army aviation, U.S. Air Force, Navy and Marine aviation as well as coalition and international capabilities; integrate operational force protection...”²⁹

Despite the apparent confusion in the terms, there is a clear intent to distinguish between Joint interoperability and Joint interdependence. Joint interoperability seems to imply a

²⁶ U.S. Department of the Army, *Our Army at War-Relevant and Ready...Today and Tomorrow. A Gameplan for advancing Army Objectives in FY 05 and Beyond: Thinking Strategically*, Washington D.C., U.S. Government Printing Office, (28 October , 2004), 14

²⁷ U.S. Department of Defense. *Joint Pub 3-01.5 Doctrine for Joint Theater Missile Defense*. Washington, D.C, U.S. Government Printing Office, 1996, I-3

²⁸ U.S. Department of the Army, *TRADOC Pamphlet 525-3-01.94 O & O The United States Army Air and Missile Defense Concept and Operational and Organizational (O&O) Plan for the Future Force, Concept Coordinating Draft (Version 3.0)*, Washington D.C., U.S. Government Printing Office, 2004, 3-6

²⁹ Michael Vane, “Historic Transformation”, *Army Magazine*, Vol 54, No 12, (December, 2004), 32

requirement by subsystems to interact, as part of a larger system, but not necessarily to develop a mutual dependency among subsystems. Joint interdependence on the other hand, seems to imply a degree of reliance on the part of one subsystem upon the capabilities of other subsystems in order to develop an increased capability, necessary to accomplish a larger system's purpose or mission. It suggests that the system as a whole might be less effective without the interdependent capabilities that the elements of one subsystem contribute to the system as a whole. Joint interdependence also seems to imply that a unified Joint effort is required to accomplish specific objectives and that those objectives should be oriented on a well defined system's objective capability, or goal. Nevertheless, seeking a goal of "Joint interdependence" with an expectation of "seamlessness" still tends to obscure the complexity of the challenge when seeking Joint capabilities.

The Department of Defense is aggressively attempting to address the need for a Joint concepts-centric capabilities identification process, and has initiated this process through the Joint Capabilities Integration and Development System (JCIDS). It represents an integrated, collaborative process to guide the development of new capabilities through the changes in DOTMLPF,"³⁰ and represents the most comprehensive effort to date to support the CJCS and Joint Requirements Oversight Committee (JROC) in identifying, assessing and prioritizing Joint military capability needs. It represents a "Top Down" capabilities identification methodology, and represents an effort to synchronize Joint capabilities requirements from the Joint level down. JCIDS should contribute significantly towards synchronizing research and development across all of the services in developing Joint capabilities. Interestingly, CJCSI 3170.01D does not refer to "Joint interdependence" stressing instead, the need for, "integrated and interoperable Joint warfighting capabilities."³¹

³⁰ CJCSI 3170.01D, A-1

³¹ CJCSI 3170.01D, A-1

The apparent inability to resolve Joint fault line issues has significant implications with respect to the services' pursuit of Joint capabilities, and nowhere is it more evident than in the JTAMD. Solutions to Joint seams within JTAMD are invariably addressed through initiatives on the part of the services themselves within a Joint operational architecture which remains largely undefined. It is not surprising that despite significant improvements in missile technology, Army AMD continues to suffer from an inability to effectively synchronize capabilities across the elements of doctrine, organization, training, materiel development and leadership and education (DOTML). The stovepipe approach to modernizing Army AMD continues to hinder progress within the branch while it also inhibits the development of Joint capabilities and the resolution of Joint issues. For example, efforts to resolve datalink and communications capabilities within the Army AMD system led to improvements in shared data and early warning within the Patriot systems. However, when integrated with Aegis and other JTAMD systems on the battlefield issues arose with respect to connectivity. Maneuver AMD units were also challenged due to exceeding the ranges of communications links which in turn affected control of AMD operations and early warning. This in turn adversely affected airspace management of the Joint Engagement Zone (JEZ). This example is somewhat of a simplification, but the fact remains that a hierarchical approach in which Joint oversight is exercised focusing and synchronizing the efforts of separate services towards development of interoperable capabilities specifically targeted at resolving a Joint goal, in this case, airspace management, is needed. Current efforts by Army AMD, the lead systems integrator for JTAMD, reflect a system of systems approach which should result in better synchronization of efforts across the services. However, as late as December 2000, Major General Larry Dodgen, Commander of the JTAMD Organization (JTAMDO) commented,

“...our military is still confronted by some of the same airspace management problems that prevented us from conducting fully Joint operations during World War II. Although the services and warfighting commanders-in-chief (CINCs) accept the need for a fully Joint solution to missile defense, progress has been hampered by each pursuing a distinct approach. Even the

Iraqi Scud missile threat that we experienced firsthand during Operation Desert Storm did little to alter this stovepipe approach to missile defense modernization.”³²

LTG John Costello, serving at that time as the Commander, U.S. Army Space and Missile Defense Command and U.S. Army Space Command, seemed to contradict then MG Dodgen’s point of view in the same issue of *Army* magazine in which MG Dodgen’s article appeared, stating that

“The synergistic effects derived from all of the Army, sister service and multinational TMD capabilities operating in a seamless integrated Joint defense ensure that the warfighter and selected geostrategic assets are protected from missile attacks.”³³

While JTAMD operations during OIF did in fact successfully protect the warfighters and geostrategic assets, the integrated Joint defense was hardly seamless. Seamless is a difficult standard to meet, especially within the context of a defense department system which disburses funding along service lines. Yet, more often than not, “seamless” is articulated as a goal expectation, along with terms like Jointness, Joint interoperability, and Joint interdependence.

In summary, there exists varying degrees of misunderstanding in the pursuit of the goal of Jointness. There is fundamental lack of appreciation for the need for a clear distinction between the terms Jointness, Joint interoperability and Joint interdependence. The terms appear in various references and imply an understood expectation which simply does not exist within different services and among the Joint community. The numerous interpretations as to the degrees of Jointness achieved during past conflicts seems to imply that Jointness resides in the eye of the beholder, with different meanings for different parties. Many, if not most examples of successful Jointness achieved during past conflicts seem to result from ad hoc solutions developed by soldiers demonstrating exceptional initiative under the duress of impending or on-going battlefield conditions. The term, “seamless Joint interdependency” is making more

³² Larry Dodgen, “Missile Defense: Joint,,” *Army Magazine*, December 2000; 25

³³ John Costello, “Missile Defense for the Transforming Army”, *Army Magazine*, December 2000;

appearances in reference documents and seems to reflect a failure to appreciate the apparent conflicts of interest associated with pursuing complimentary Joint capabilities within a system which disburses resources and funding along service lines, consistent with service priorities. Citing “seamless Joint interdependency” as a goal, especially in terms of JTAMD systems, seems to take for granted the exceptional complexities associated with developing and integrating different technological capabilities within a single service. Joint interdependence requires a Joint funding source, a directive oversight authority, and clearly stated objectives that are associated with specific Joint capabilities. Short of this level of clarity and unity of effort U.S Forces can expect more of the same; resource constrained pursuit of Joint capabilities within the services, limited Joint training, and capabilities jammed together on a Joint level as units approach the line of departure.

THE NATO MODEL³⁴

There are some key aspects to Air Defense operations conducted during the Cold War that are worth revisiting. The Cold War strategy of Containment, with the advantage of a single, clearly defined threat, facilitated the need for close cooperation among sister services and allies in deterring that Cold War threat, specifically as it related to Europe. In Europe, mature organizational structures and well understood doctrine reflected an exceptionally coherent “Joint” air defense system. Chains of command were clearly established and understood, and relationships between U.S. Forces and allied forces were reinforced through frequent allied training events. Particularly noteworthy was the exceptional emphasis on training and the clear expectations associated with air defense training. Training “in time of war” involved centralized standards. All “Joint” air defense units in Europe, to include allied units, trained to one set of doctrinal standards, the SUPPLAN Mike and SUPPLAN Delta NATO doctrine. New HIMAD

³⁴ Discussion on the NATO Model is based upon the author’s personal observations and experience in various leadership positions culminating with three years service as a Battery commander during the period 1985-1992 in the Europe.

officers and their crews, across Europe, were certified to one standard, the same standard. Typically, certification training was conducted by the firing battery and certification was verified by the Battalion evaluation team, commonly referred to as the “EMMO” team. As soon as a new officer and his crew were certified by their Battalion that crew was subject to “no-notice” evaluations by the Brigade, which had its own evaluation team, and by the 32d Area Air and Missile Defense Command (32d AADCOM), as well as by NATO evaluation teams.

NATO evaluation teams conducted annual unit/crew proficiency evaluations to certify readiness of organizations to perform their NATO mission. These evaluations were known as Allied Air Forces Central Europe (AAFCE) Tactical Evaluations. AAFCE evaluations included assessments of the unit’s response to emergency message receipt and verification, alert and recall, on-site system generation, deployment to battle positions and their conduct of air defense operations and survival to operate (STO) operations over a 72 hour period. The evaluation teams were comprised of both U.S. and NATO soldiers as well as representatives from the 32d AADCOM EMMO team. Every Air Defense crew in Europe also underwent a separate Electronic Counter-Counter Measures (ECCM) evaluation by U.S. forces on a quarterly basis, and annually as part of the AAFCE Tactical Evaluation. This evaluation was exceptionally demanding and involved testing crew procedures versus a wide variety of stressing threat scenarios to include countering jamming TTPs.

The 32d AADCOM EMMO team was comprised of senior Warrant officers and senior noncommissioned officers selected for their exceptional tactical and technical expertise. These teams were assigned the responsibility for validating knowledge of NATO TTPs, and compliance with those TTPs. As such, they had unlimited access to all facilities, and crew certification records at any time. In addition to serving as an evaluation team, the 32d EMMO team served as the senior subject matter experts in Europe for U.S. Army Air Defense issues. They served as the repository of knowledge with respect to lessons learned, system capabilities and limitations, and new equipment training and fielding initiatives. The 32d EMMO team also served as the 32d

AADCOR Commander's advisors on the state of readiness for U.S. Air Defense forces in Europe. The team possessed the knowledge and authority to ensure that standards were understood, and complied with. Additionally, the team served as readily available sources of information and training assistance. All questions on doctrine or system capabilities/limitations, that could not be resolved at lower levels were forwarded to the 32d AADCOR for final resolution.

HIMAD units in Europe maintained set States of Operational Readiness (SOR). At all times various units across Europe served in a "hot state" or 20 minute state. A unit in 20 minute SOR maintained its full crew on site for 24 hour shifts and performed full system checks every six hours. Units in the hot state were expected to have their system prepared for war within twenty minutes. Crews at the tactical and operational levels manned air defense systems 24 hours a day and trained together as a matter of routine. Units in 20 minutes state would participate in twice weekly, evening Air Battles. The unique aspect of this Air Battle Training was that it involved units from the tactical to the operational level simultaneously. A battery crew, and both Battalion and Brigade Fire Direction Center crews, would all participate in an air battle managed by Air Force command and control elements. Air tracks were passed and simulated engagements were tracked at every level and monitored simultaneously over the headset at each level. It was not unusual to hear the Brigade Commander's voice over the communication net, or to have the Battalion Commander, S3 or XO standing in your van as you conducted the training. The levels of proficiency attained by crews and individuals at all levels were exceptional. If an evaluation team at a higher level was not comfortable with the proficiency of a crew, they had the liberty to order specific crews up to an evaluation SOR and would do so frequently.

There were some disadvantages to training in such a formal, established framework. First, it required the implementation of states of readiness, or preconditions to facilitate evaluations. With the end of the Cold War, Europe eliminated the SOR, and with it the system of universally accepted standards. Maintaining an SOR system was regarded as unnecessary given

the elimination of the threat, and eventually, responsibility for training certification and validation decentralized to the lowest tactical level. Another disadvantage involved the Threat set. The Threat set oriented on massed waves of aircraft and not missiles. Counter-TBM technology had not evolved at that point. Given the geographic proximity to the enemy, training against this Threat set tended to reinforce a mindset of fighting from fixed positions, involving very limited tactical maneuver and almost no emphasis on strategic deployment.

Despite the apparent disadvantages a comprehensive, accepted Joint operational architecture and Joint doctrine were firmly in place. The crew proficiency standards were exceptionally high and balanced across both Joint and allied AMD systems. Perhaps the most significant components of this system were the clarity of standards, the frequency of the Joint training, the cross-fertilization with NATO allies, and the clearly structured, echeloned evaluation process. This structure serves as an exceptional model for the development of Joint TAMD doctrine. It also serves as a useful point of reference in realigning contemporary training strategies as well as serving to highlight the advantages of operating JTAMD within a well defined Joint operational architecture.

It is not easy to identify and articulate clear goals, and many organizations have struggled because of difficulty in accomplishing this key requirement. However, this requirement is made even more difficult in the absence of a single recognized Joint oversight authority, responsible for setting those goals. It appears that the services recognize the need for clear Joint goals. But in the absence of a Joint oversight authority, goal-setting continues to take many forms, with many sources, and numerous interpretations as to what the expectations are or should be in terms of achieving Joint capabilities. Efforts to define Jointness from the top down take the form of various terms and degrees of Jointness, in various references, and seem to take for granted the resource requirements necessary to accomplish "Jointness". The result is the setting of unrealistic expectations, unreasonably constrained by resources and invariably results in frustration at several levels. It is especially frustrating for services working together from below,

to resolve Joint issues, and develop Joint goals, while lacking the authority to resource Joint initiatives. Department of Defense initiatives such as JCIDs and service initiatives such as the Army-Air Force Warfighter's conferences and the Tri-Service Working Group, represent ongoing struggles to treat the symptoms of dis-Jointedness vice the disease itself. It is very clear that absent a single Joint oversight decision-maker, armed with Joint funding authority clarity in goal setting will not be achieved with the result being that the best efforts of the services will not accomplish anything approaching "seamless" Joint interdependency.

INTERDEPENDENT RELATIONSHIPS AND THE ARMY AMD SYSTEM

Doerner identifies the need for "structural knowledge", or "knowledge of how the variables in the system are related and how they influence one another."³⁵ He points out that if we want to operate within a complex and dynamic system we have to know, "not only what its current status is but what its status will be or could be in the future,...and how certain actions we take will influence the situation."³⁶ Understanding the interaction of key variables within complex systems is difficult, but establishing structural knowledge allows the development of order and system hierarchy which facilitates understanding and helps determine a possible path towards a desirable future state. I will attempt first to identify characteristics of key variables within the Army AMD system and then discuss how they interact. I will attempt to identify system hierarchy and discuss the second and third order effects that resulted from the interaction of key variables to determine the impact upon Army AMD in the pursuit of JTAMD capabilities.

JTAMD effectively began during Operation Desert Storm with the first launch of a Patriot missile against an inbound SCUD TBM. Much has been written about the positive psychological impact of the system during the early phases of the war and the inflated initial

³⁵ Doerner, 41

³⁶ Ibid, 41

reports of engagements. However, the end of the war brought with it scientific scrutiny and criticism with respect to the performance of the Patriot missile and its associated technology. This inspired a headlong pursuit within the Army AMD community to invest resources in the research and development of a more lethal counter-TBM capability. The resulting system, the PAC-3 weapon system, introduced Hit-to-Kill technology with numerous improvements to the radar and communications systems. In order to understand the complexity associated with fielding the PAC-3 weapon system it is important to understand the environment in which the Army AMD system operated.

PAC-3 GROWTH PROGRAM

“In the years between Desert Storm and Operation Iraqi Freedom, there were two overarching developments within the JTAMD community. First the Army created a single command to oversee the integration of all TBM and defense systems...second, the Army made a commitment to modernizing the Patriot force and developing the PAC-3 weapon system.”³⁷

The PAC-3 growth program occupied the top rung in the hierarchy of post-Desert Storm activities within the Army AMD community. There are several inherent risks associated with pursuing materiel and technological advances within a complex system, as a response to criticism. First, there is the risk of “repair service behavior,” in which the fix is applied to the obvious shortcoming without analyzing the inter-related variables and how an action with respect to one variable affects the other variables within the system. This is critical because the problem being fixed may be a function of the system, or another variable within the system, and could lead to fixing the problem, or disregard for problems that might evolve as a result of the fix. In the case of the PAC-3 growth program, particular attention needs to be paid to the need to balance training and leadership in order to ensure that technical capabilities do not exceed operator

³⁷ *Operation Iraqi Freedom, Theater Air and Missile Defense History*, 32d Army Air and Missile Defense Command (AAMDC), (September 2003), 2

proficiency. There is also an inherent risk that the pursuit of materiel development sometimes consumes a disproportionate amount of resources. In this complex environment it is important to balance pursuit of materiel and technological development with training, and leadership development, as well as the other domains, in order to preclude second and third order effects which might result in the development of superior technological capability without actually solving the problem of creating a more effective counter-TBM capability.

On 13 May 1993, the Strategic Defense Initiative Organization, (SDIO) was redesignated the Ballistic Missile Defense Organization (BMDO). Shortly after, the Bottom-Up Review (BUR), published in the Fall of 1993, laid out a new missile defense program. The top priority of the BUR was Theater Missile Defense, which was to receive \$12 Billion dollars over the course of five years. Three systems formed the core of the TMD component: Patriot Advanced Capability-3 (PAC-3), the Navy Aegis system and the Army's Theater High Altitude Area Defense (THAAD) systems. BMDO reports to the Under Secretary of Defense for Acquisition, Technology and Logistics and is responsible for managing and directing DoD's Ballistic Missile Defense acquisition programs, and for the continuing research and development of follow-on technologies that are relevant for long-term ballistic missile defense. These programs build a technical foundation for evolutionary growth in future ballistic missile defenses. In developing these acquisition and technology programs, BMDO utilizes the services of the Military Departments, the Department of Energy, private industries, and educational and research institutions.³⁸ Still, a Joint perspective that incorporated the Joint operational concepts and linkage to the warfighter's perspective was needed. One of the recommendations of the 1994 Defense Science Review Board (DSB) "Summer Study on Cruise Missile Defense", was the recommendation for the establishment of a Joint organization that focused on integrating Joint

³⁸ Ballistic Missile Defense Organization web site

requirements/doctrine and system engineering/acquisition. On March 2, 1997 the JTAMD Organization, JTAMDO, was formed. JTAMDO was formed to,

“...coordinate with war fighting CINCs and military services to develop the Joint operational concepts, capstone requirements and operational architecture for fielding a Joint, integrated theater air and missile defense capability. The Joint working group also developed the JTAMD process, a DoD management process to integrate the requirements activities of the services and the Ballistic Missile Defense Organization. DoD finally had the organization structure and process in place to achieve Joint TAMD operational capabilities it need for the future.”³⁹

JTAMDO, and BMDO work with U.S. Joint Forces Command (USJFCOM) and other agencies to coordinate Joint requirements in an effort to advance interoperability. The efforts of the JTAMD process resulted in the Joint Requirements Oversight Council (JROC) approval of the JTAMD Mission Needs Statement (MNS) in the summer of 1999, just shy of two years before the commencement of OEF/OIF.

Ft Bliss and the acquisition community executed a Herculean effort to rapidly upgrade Patriot capabilities and field PAC-3 weapon system improvements. Planning and coordination efforts were well thought out and executed as effectively as could be expected given the dynamics of the environment within the Army AMD branch, both the on-going regional priorities and the bifurcated organizational dynamics at Ft Bliss itself. PAC-3 systems upgrade and fielding involved three configuration upgrades culminating with Configuration-3 which consisted of seven major improvements, including three hardware modifications, three software program upgrades and the PAC-3 missile itself. Configuration testing required a dedicated active component Patriot battalion and was conducted between November 1998 and October 1999, with a First Unit Equipped (FUE) in September 2001. The technological improvements increased battle-space and improved higher range resolution, JTAMD interoperability and provided a hit-to-kill capability.⁴⁰ However, determining fielding priorities for Patriot system upgrades, and

³⁹ Dodgen, “Missile Defense:Joint”, *Army Magazine*, (December 2000), 25 available on line at <http://www.ausa.org/www/armymag.nsf>

⁴⁰ *Operation Iraqi Freedom, Theater Air and Missile Defense History*, 11

associated training on the accompanying upgrades involved significant tension, as well as a degree of confusion, despite the best efforts of very competent leaders. Tactical units were tagged with the responsibility for serving as test beds for software and hardware upgrades, and associated training, and this affected their status for periods of between six months and one year. Brigades attempted to maintain readiness postures for real-world crises, and to support the SWA rotations, but if a battalion within a brigade was tasked to support software upgrades, or fielding hardware upgrades, the brigade ran the risk, and indeed it occurred, of battalions within a brigade unable to communicate or effectively execute command and control requirements due to differences in fielded software/hardware upgrades between the brigade and one or both battalions.⁴¹ The fielding of the PAC-3 capability to JTAMD force in time to support operations in OIF represented heroics on the part of individuals in both the operational and acquisition fields. However, a critical assessment could indicate that the rapid fielding, along with the complex JTAMD environment resulted in mixed overall results, as OIF lessons learned suggest.

While the evolution of the JTAMD process demonstrates clear progress in the quest to establish a process for synchronizing a service weapon system like PAC-3 with JTAMD requirements and doctrine, engineering and acquisition processes, it also reveals that initial efforts to respond to Operation Desert Storm JTAMD lessons learned emphasized technological solutions, while doctrinal, training, and leadership education processes remained subordinated to a large degree. The disbursement of funds to pursue materiel advances in PAC-3 technology was initiated a full five years before a system was designed to define how this capability would be integrated into a JTAMD system. In the interim, Army AMD units struggled to sustain unprecedented deployment OPTEMPO while supporting testing and fielding of the PAC-3 weapon system. The fact that the PAC-3 weapons system was fielded as widely to the force as it

⁴¹ Discussion on the challenges associated with fielding PAC-3 upgrades is based upon first-hand observations by the author while serving as the Assistant Product Manager for PAC-3 Project Office, and in a subsequent assignment as the Executive Officer for the 3rd Battalion 43rd ADA, within the 11th ADA Brigade, during PAC-3 fielding efforts at Ft Bliss, Texas.

was, given the incredible challenges to sustain a host of competing priorities within the branch, speaks to its primacy within the domains. The superior performance of the PAC-3 weapons system on the battlefield reflects the significant technological advances that were achieved. However, assessments of crew proficiency before the start of combat operations revealed disparities in crew proficiency and general lack of understanding as to how the weapon system performed. These concerns were borne out in post-fratricide assessments which referenced crew proficiency shortcomings and lack of familiarity with system capabilities of the PAC-3 weapons system by operators. The Army AMD community has responded aggressively to address the training issues. However as the branch moves forward to transform its own forces in step with Army transformation objectives, it is instructive to understand the potential second and third order effects when primacy of technological advances out paces training and leadership development focused on mastery of that weapon system's capabilities. Capability is a function of technology *and* the training, leadership, doctrine and organization. A critical assessment of JTAMD performance during OIF may inspire consideration for the development of a new model, one in which Training and Leadership development retain primacy, focusing more emphasis on the development of centralized training and evaluation systems, with the objective of attaining mastery of the fielded system at both service and Joint levels, and less on the continuous technological upgrades.

ORGANIZATIONAL FRICTION

Organizational structure represents a key variable in the development of service and Joint TAMD capabilities and there are several inter-related variables which influence the development of proficient JTAMD capability. The Army AMD force structure, specifically the bi-furcated structure that exists between TRADOC, FORSCOM and Corps AMD units that exists on Ft Bliss inhibits a unified approach to managing OPTEMPO requirements, standardizing Army and JTAMD TTPs , and participation in a centralized Training and Assessment architecture.

Additionally, the changing pattern of command relationships in combat versus those exercised in garrison, as well as the Army's transformation push towards a modularity objective of forty-three Units of Action (Ua), suggests that the Army AMD's current habitual relationships maintained in garrison may not stand the test of war where Army AMD and its inherently Joint mission are concerned. This further suggests that an opportunity exists to realign CONUS AMD units under Ft Bliss and Army AMD leadership tasked with responsibility for providing trained and equipped Army AMD forces for the Joint Forces Commander.

With the end of Desert Storm, the Army began marching to the drum beat of new plans involving a massive force drawdown. This drawdown would signal unprecedented changes in the structure and nature of Army AMD. At the conclusion of base realignment within the branch, the Army AMD had one Brigade deployed overseas, the 69th Brigade, subordinate to the V Corps in Europe, and one Patriot missile Battalion, 1-43 ADA, deployed to Korea, subordinate to the Eighth U.S. Army and US Forces Korea. The rest of the Patriot missile Brigades and Battalions were redeployed to Ft Bliss from various locations within the United States and from Europe. The 11th ADA Brigade, subordinate to Third U.S. Army and FORSCOM, comprised two Patriot missile Battalions and performed an Echelon Above Corps (EAC) AMD mission. The 35th ADA Brigade comprised one Patriot missile Battalion at Ft Bliss, 2-1 ADA, and one Battalion, 1-43 ADA, deployed forward to Korea. In the case of the 35th Brigade, the Brigade headquarters and staff and 2-1 ADA were physically located on Ft Bliss, and they maintained their command relationship subordinate to the Eighth U.S. Army and U.S. Forces Korea. The Corps ADA Brigades, or those Brigades subordinate to U.S. Army Corps included the 31st Brigade, physically located on Ft Bliss with two Patriot missile Battalions, and subordinate to the III Corps, headquartered at Ft Hood Texas. The 108th Brigade with two Patriot missile Battalions was also physically located on Ft Bliss with a supporting mission subordinate to the XVIII Airborne Corps. In sum, the branch consisted of five tactical Patriot Missile Brigades and ten battalions of which four brigades (eight Battalions), resided directly on Ft Bliss. At a glance, the close

proximity of the majority of AMD brigades at Ft Bliss seemed to represent an opportunity to refine Army and Joint TTPs and validate them through an aggressive centralized training venue. Expertise from across several brigades could be used in a cross-fertilization effort to reinforce standardization and routinization of AMD TTPs. Pooling forces at Ft Bliss also gave the appearance of flexibility in resourcing an increasing demand for Patriot fire unit deployments in Southwest Asia. However, in effect, two of the four brigades derived their priorities from Army Corps external to Ft Bliss. Corps training priorities, exercise commitments, relationships, and organizational structures into which they must fit during war are established and ruthlessly protected, and on occasion, distinctly at odds with priorities and guidance issued by Ft Bliss, and the Air Defense community. It isn't difficult to imagine the competing interests that are created when the Army AMD community attempts to impose requirements on an organization whose primary allegiance is to a Corps, whose headquarters are also geographically displaced. Over time this fostered a subtle sense of independence, a sense of residence within the AMD community, but not necessarily subordination to AMD priorities. The temptation to resist influence from within Ft Bliss in deference to Corps priorities was very real and very extensive and continues to this day.⁴² This framework set the conditions as the Army AMD community pursued an aggressive agenda that included among other priorities; (1) the sustainment of one of the highest deployment OPTEMPO rates in the Army; (2) the testing, experimentation and fielding of the PAC-3 growth program; (3) the development of Army AMD and Joint TAMD doctrine and TTPs; and, (4) the initiation of an annual Joint exercise designed to exercise the AAMDC in its role as Army AMD integrator in the JTAMD system.

⁴² Discussion with respect to organizational friction resident among the TRADOC and FORSCOM units at Ft Bliss is based upon personal observations and experiences of the author while serving 18 months as the Executive Officer for a tactical PATRIOT Battalion on Ft Bliss, and as a Joint planner for three years for Joint Task Force-Six, a tenant unit in the Ft Bliss community.

Patriot Deployment Missions

In 1991 the Army initiated the requirement to deploy Patriot fire units to Southwest Asia (SWA). Two AMD battalions supported six month deployment rotations to Southwest Asia on an annual basis. In October of 1994 the Army decided to permanently deploy one Patriot missile battalion to South Korea. In coordination with the III Corps and XVII Airborne Corps, Ft Bliss was able to incorporate the Corps ADA brigades into SWA deployment rotations. Several interesting dynamics began to emerge with the increased deployment requirements. Initially, the AMD soldiers found themselves constantly rotating overseas. Many of the soldiers returning from their six month deployment to SWA executed their normal permanent change of station (PCS) from one air defense battalion to another, right there on Ft Bliss, only to find themselves deploying right back into the theater. By 1996 it was not uncommon to have soldiers within battalions who had conducted in excess of ten deployments overseas, the bulk of them to the SWA area of operations. It didn't take long before OPTEMPO affected the morale of both soldiers and family members within the Army AMD community.⁴³

The rotation of units from different brigades through the SWA mission revealed subtle, yet distinct differences in the training methods of the different brigades. In the absence of an Army AMD Tactical SOP, brigades operated according to their own Tactical SOPs. The decentralization of a training assessment mechanism to the brigade and battalion levels that occurred with the end of the cold war, fostered the development of different training standards and TTPs which were dependent upon the type of brigade, and the level of technical and tactical expertise within that brigade. The absence of a centralized assessment mechanism above the brigade level precluded a branch-wide effort to resolve variations in the interpretation of Gunnery Table certification standards as well as various tactical TTPs practiced among the brigades.

⁴³ Discussion of OPTEMPO impact is based on the author's personal observations and input to personnel studies conducted within Patriot units during this time period.

Brigades continued to pursue Gunnery Table certifications differently, applying and ruthlessly defending their own interpretations as to how training should be conducted and how certification standards were to be assessed. In some cases brigades reported the attainment of Table XII as a stated training goal, while lacking an evaluation team at the brigade level to validate the certification.⁴⁴ In other cases brigades conducted Gunnery Table training and evaluation procedures differently. Without a centralized honest broker this led to disagreements as to the validity of gunnery certification levels within different brigades and battalions. This problem only seemed to become more contentious the further away from Ft Bliss one got where units in Europe and Korea did not necessarily utilize the same tactics, techniques and procedures in performing JTAMD training or evaluations. It was not unusual to hear soldiers and officers denigrate the qualification standards and methods as performed in Europe versus those performed in CONUS or Korea. In the case of Gunnery Tables, units disagreed with respect to differences in the execution of training even though they referenced the same Gunnery Table reference source. It is little surprise, again, that several sources point to disparity in crew proficiency and system knowledge when all Army AMD units deployed to the same theater simultaneously and were forced to operate subordinate to the 32d AAMDC during OIF. There is a clear need to centralize training and assessment at a level above the Brigade in the Army AMD community.

Several indicators should have signaled a need to overcome the natural post-war tendency to decentralize training assessment. The end of the cold war on the heels of victory in Operation Desert Storm occurred almost simultaneously with the fielding of configurations of the PAC-3 weapon system, signaling an increasing complexity in an otherwise already complex system. An appreciation for the demands associated with an accelerated acquisition program fielded across the geographically dispersed force, during a period of increasing OPTEMPO should have

⁴⁴ Discussion on the different interpretations of Table Training standards is based on the author's personal experience and observations while serving in positions to include, Executive Officer within a Patriot Battalion at Ft Bliss, Texas and as a Battalion Commander for the 5th Battalion, 7th ADA in the V Corps, US Army Europe.

signaled the need to retain some aspects of the centralized training and assessment architecture that existed in Europe in order to sustain proficiency while maintaining some balance in training consistent with the technological advances being fielded. While this is hindsight at this point, it serves to reinforce the need in the future, to balance technology advances with training and leadership, targeting the inevitable human element, and utilizing a formal, external training and assessment structure to mitigate disparities in standards and validate readiness.

Habitual Relationships

During Operation Desert Storm, Army AMD units served in several unique organizational structures. The 4th Battalion, 43d ADA (PATRIOT) deployed to Israel. The Israeli theater presents unique challenges even to this day. However, in 1990, within ninety days of receiving their own Patriot weapons system, and with crews only partially trained, Israel manned its first Patriot system and engaged a TBM the very same evening. U.S. Patriot forces served in a TACON relationship with the Israeli Defense Force with Patriot firing batteries serving as part of coalition Task Force, TF Patriot Defender. In Turkey, two fire units served as part of TF Proven Force under a NATO command structure. In Saudi Arabia and Iraq TF 8-43, a Patriot/HAWK task force served in TACON role to the 11th ADA Brigade but with operational control residing with VII Corps. The bulk of Patriot forces serving in Operation Desert Storm served under the 11th ADA Brigade, with the brigade maintaining tactical and operational control of those forces⁴⁵. The challenge inherent in this command relationship inspired a major doctrinal and organizational initiative after the war, and resulted in the creation of the Army Air and Missile Defense Command.

During OIF, forces on the battlefield found themselves facing similar unexpected command relationships, supporting chains of command other than those they had formed habitual

⁴⁵ The discussion of command relationships among Army AMD units during Operation Desert Storm is detailed in Chapter Six, of LTC Frank Caravella's, *First To Fire*, 93-110.

relationships with during garrison operations. In Europe the 69th Brigade headquarters, the V Corps AMD brigade, served as the headquarters for JTF Cobra performing an EAC strategic AMD mission in the defense of Tel Aviv, Israel. Two firing units within the brigade were tasked to support the planned 4th ID invasion of northern Iraq through Turkey.

The 32d AAMDC allocated forces throughout the theater based upon PAC-3 missile capability and defended asset list priority. Initially, 11th Brigade was tasked to defend V Corps as it conducted Reception, Staging and Onward Integration (RSOI). Upon deployment to Kuwait the 31st Brigade assumed the initial task of protecting V Corps operational priorities, and then followed to provide continuous protection during maneuver operations north into Baghdad. The 108th Brigade conducted unprecedented direct support to the 1st Marine Expeditionary Force (I MEF). Key to the success of Army AMD support to the war was the 32d AAMDC ability to respond to evolving mission requirements by anticipating and planning contingencies in advance. The 32d AAMDC utilized a “playbook” of contingency plans that oriented on key theater level decision-points in order to task subordinate batteries, and again altering previously understood habitual relationship.⁴⁶

I am not in favor of severing any ties that units have developed through habitual relationships with Army Corps. Success on the battlefield remains a function of tactical proficiency and trust formed through relationships and training. However, I think Army AMD needs to refocus training efforts orienting on acquiring mastery on Army AMD systems, standardizing TTPs across the branch and training extensively within the Joint architecture to achieve mastery as Joint air and missile defenders. The Army AMD community could initiate this process by centralizing control of all CONUS AMD forces and developing a centralized Army AMD Training and Evaluation process which augments Brigade training efforts while

⁴⁶ Discussion of the OIF command relationships prior to the commencement of operations in support of OIF is detailed in *Operation Iraqi Freedom, Theater Air and Missile Defense History*, 20-22, and 37-43.

enforcing standardization of TTPs and validation of certification standards. TSOP procedures by which the 32d AAMDC will manage Army AMD forces in war needs to be enforced and validated by an objective disinterested party across the branch. Short of this, standard will continue to vary across the branch with shortfalls exposed only when units from various organizations are placed side by side in the same theater of operations.

TRAINING

Army AMD community has fallen victim to what I refer to as “line-of-sight-training”. This is characterized by delegation to and over-reliance upon contractor support to train and educate leaders and crews in the performance of their tasks, an aspect that reflects the primacy that the pursuit of technology has acquired. Over-reliance on contractor support also reflects Army AMD attempts to overcome service parochial resource constraints that inhibit the realization of many Joint training objectives. Line of sight training is also characterized by the lack of Masters, those technically superior senior warrant officers and battle-proven senior officers and noncommissioned officers in whom the branch has placed complete faith and authority for ensuring that training and competency is not a priority, but rather *the* priority. It is characterized by depth of vision which is focused on simply getting through established gates, or training levels, without pursuing “mastery” of the system as a goal. Most importantly it is characterized by the lack of a training and assessment architecture that enforces standards and facilitates learning and change at all levels, across the breadth of the branch, necessary to accommodate the demands of this highly complex JTAMD environment.

The training characteristics identified above result from a conflict of systems in which priority of resources have been committed to materiel development instead of Joint integration and Joint training designed to address complexity and AMD TTPs at the Joint, Operational and Tactical levels as part of the JTAMD. The development of a strategy to address the

characteristics identified above requires an understanding of the complex system and variables which contribute towards inhibiting successful Army AMD training.

There are three key points of issue with respect to training that I think continue to inhibit individual and crew proficiency within the Army AMD and the JTAMD systems. First, the Army AMD lacks a centralized training and evaluation process above the brigade level. Currently batteries train crews and prepare for collective training IAW Gunnery Tables standards. These standards themselves involve at times, a liberal interpretation as to exactly what constitutes the standard under certain conditions. Different units pursue Gunnery Tables differently. One only need ask a soldier who has served in different brigades, or different theaters, to articulate the different standards or different procedures for conducting Gunnery Table evaluations, to understand that there is variance in the interpretation and execution of the Gunnery Tables and associated Reticule Aim Levels (RALs). Most of this deviation is due to the degree, quality, and quantity of expertise within the organization. Organizations emphasize different aspects differently. That these differences in the application of standards exist is less troubling than the fact that there is no oversight mechanism to assist in resolving differences in interpretations of standards, and there is no objective, disinterested party to ensure there is no deviation from the standard. Add to this the complexity associated with rapidly evolving communications capabilities and rapidly advancing system capabilities and it becomes clear there is not only a need for constant updating of standards, but there is a genuine need for assistance and knowledge sharing. In other words, the evolving imperative involves the proactive and continuous management of change itself. Managing change in a complex environment requires continuous assessment, training, re-assessment, and re-training simply to sustain a practical level of proficiency across the branch, and within the Joint architecture. Currently there simply is no process that formally validates, trains, and assesses crew proficiency within the Army AMD architecture or within the JTAMD joint architecture. The Army AMD has recently initiated programs designed to develop and identify “Masters” in various occupation specialties. Despite

the clear advantages that this effort should produce, the issue at heart remains how validate proficiency as part of system, within the construct of a service and joint architecture, and how to do this during garrison operations. Mastery of an individual occupation specialty does not translate into mastery of a highly complex system which is continuously challenged by evolving communications systems that challenge existing bandwidth allocations, evolving strategic implications with respect to joint TTPs, and rapidly advancing technical capabilities of both friendly and threat systems.

Another interesting dynamic has also occurred over the past decade with respect to warrant officers and their roles as master tacticians. As the Patriot system began to grow in complexity, the warrant office corps was asked to branch into management of logistics and maintenance necessary to maintain this highly complex system. Tactics continued to evolve more and more while warrant officers focused less and less on training and tactics and more and more on logistics and maintenance. The result was the creation of a void in expertise on the tactical application of the system. Warrant Officers used to perform the responsibility of training and certifying young officers and their crews. Warrant officers were perfect in this role because they truly “lived on the system”. They became masters of the technical capabilities and tactical application of the system. As commissioned officers moved on to assume staff responsibilities and other professional responsibilities the warrant officer stayed with the system, as it evolved technically and as tactics changed. This shift has left the branch with a dearth of masters, experts on the Patriot weapon system. This has fostered an over-reliance on the system and its inherent capabilities by junior officers. Hence the post-war assessments that crews did not understand the capabilities of their weapon systems, or reports that poor crew proficiency contributed to fratricide. An assessment of all crews deployed for OIF, before the initiation of combat revealed

an alarming disparity in crew proficiency and system knowledge⁴⁷, reflecting more on the absence of a system for validating proficiency and training programs within the branch, than on a particular unit's training shortcomings. Combat readiness assessments are necessary and need to be ruthlessly employed often, well prior to the assembly of forces on the battlefield.

While Ft Bliss has taken steps to address the crew proficiency disparity there are still indicators that training distractors continue to adversely affect training. Prior to unit crews participating in training at the Drive-Up Simulator Training (DUST) facility at Ft Bliss individuals are required to take a pre-training test. A recent review of these test scores reflected that soldiers' pre-training scores were overwhelmingly unsatisfactory. Post-training scores were considerably improved, reflecting admirably on the training. However, the discouraging aspect of this process is that the same soldier participating in training subsequent to this training cycle reported unsatisfactory scores upon his return to the DUST facility for training. Soldiers were questioned on this and reflected that there were very limited opportunities to conduct training in between DUST facility training events.⁴⁸ Soldiers are soldiers however and it could be just as likely that they viewed my questions as an opportunity to vent colorfully. However, the test scores bear witness to support their claim that training conducted between DUST facility training may be constrained considerably. It would appear at a glance, that training has yet to achieve the primacy that is required. The possibility that this problem exists within other service reinforces the need to implement an assessment process at both the Army AMD level and the JTAMD level.

⁴⁷ The conclusion of the disparity of crew proficiency across the branch among units deployed in support of OIF is drawn by the author based on informal discussions of observations with personnel tasked to perform this assessment. OIF Lessons Learned, only recently released, generally support this conclusion.

⁴⁸ Conclusions reached with respect to training resulted from the author's personal inspection of pre-training testing results for soldiers from several units which had completed training at the DUST facility. This inspection did not involve a thorough review of test reports for every unit that participated in this training. The interview comments reference discussions with a very small group of soldiers all belonging to a single unit. However, interviews with the managers of the facility and those tasked to assess and perform training indicate that trends observed are generally consistent across the branch, leading to the conclusion that training is not effectively sustained in between DUST facility training cycles.

A second training issue exists with respect to the lack of frequency and breadth of JTAMD training and assessments. There simply is not sufficient Joint training to validate the Joint synergistic effects of the services capabilities or the Joint tactics, techniques and procedures at either the Army or Joint levels. The 32d AAMDC concept was approved in December of 1996. It was not until October 2002, during Exercise Pointed Arrow, that the AAMDC exercised command and control over more than one brigade, and this occurred as a simulation exercise.⁴⁹ On the one hand, the AAMDC continued to move forward aggressively exercising its capabilities and ferreting out complex challenges associated with the evolving JTAMD. On the other hand, Pointed Arrow reflects the limited incorporation of tactical fire units in a role subordinate to the AAMDC under realistic battlefield conditions, and it reflects the first opportunity to exercise command relationships similar to those that would be experienced during OIF. March 2005 represents the first opportunity in which an Army AMD tactical unit participated within the Joint Forces Air Component Command (JFACC) JTAMD architecture as part of the Joint Red Flag exercise.⁵⁰ While CONUS based AMD units participated in Joint Red Flag from deployed locations at Ft Bliss, the benefits of participation in an exercise of this scale were actually realized by a very small proportion of the total number of tactical units within the branch. The JFACC operated out of the recently constructed Combat Air Operations Center (CAOC) at Nellis AFB. The creation of the permanent CAOC facility at Nellis AFB represents a huge opportunity to routinize training exercises and establish a training and assessment architecture at both the Joint and Army levels. The Army AMD needs to work with the USAF in an effort to increase the frequency of this type of exercise and the Army needs to establish a lower tier of Army specific AMD exercises with both systems feeding off each others efforts. The goal is to ensure every tactical AMD unit is assessed and trained by their service, by an Army AMD team of masters.

⁴⁹ *Operation Iraqi Freedom, Theater Air and Missile Defense History*, 22

⁵⁰ Based upon the author's review of Red Flag Historical records and interviews with Red Flag exercise historians.

These teams would then be certified in a quarterly or semi-annual JTAMD exercise by a Joint ORE team.

Army AMD systems have deployed into the SWA theater continuously since the conclusion of Desert Storm. In the SWA theater, Joint and coalition forces conducted a Joint/coalition exercises or real world deployment event every year from 1996 to 2001. Patriot units also supported Operation Southern Watch beginning in September 1992 and Operations Desert Strike with two reduced readiness batteries between February 1998 and May 1998. Between February 1998 and November of 1998 Army AMD forces supported Operation Desert Thunder I and II rotating a battalion minus and personnel to operate two Reduced Readiness Batteries (RRBs) in SWA. Between December 1998 and January 1999 Army AMD provided 2 battalions in support of Operation Desert Fox.⁵¹

The success reflected in the Kuwaiti-U.S. counter-TBM performance during OIF serves as a particularly noteworthy example of the value of combining frequency and depth in conducting Joint and Coalition training. Desert Thunder I and II enabled the 32d AAMDC with a USAF Control and Reporting Element (CRE) and elements from the 11th ADA Brigade and the 31st ADA brigades, to rehearse fully integrated air and missile defense TTPs with Kuwaiti forces. The 32d AAMDC capitalized on these opportunities to develop and refine procedures for combined U.S. and Kuwaiti air and missile defense, interoperability and training. 32d AAMDC also, “worked to expand the theater ballistic alert and warning architecture within Kuwait and validated its ability to conduct reception, staging, onward movement and integration (RSOI) operations. The 32d AAMDC also established the Tactical Data Information Link (TADIL) and developed extensive expertise in exercising its roles as the Theater Army Air and Missile Defense Coordinator (TAAMDCOORD) for the ARFOR, the Deputy Area Air Defense Commander for

⁵¹ *Operation Iraqi Freedom, Theater Air and Missile Defense History*, 1-9

the Combined/Joint Forces Air Component Commander (C/JFACC) and as the commander of all Echelon Above Corps air defense assets in the theater.⁵²

Significantly, the 32d AAMDC identified the need for a training and assessment mechanism, implementing a combined Operational Readiness Evaluation (ORE) team in order “to further solidify combat readiness and training.”⁵³ There is significant resistance within the Army AMD community with respect to developing this ORE team on a full time basis and incorporating it into a training and assessment role is curious. If the ORE team, and an assessment process were essential in the run up to war, and worked supremely in Cold War Europe, albeit under different conditions, then the Army AMD should exploit this process as a matter of routine, within a Joint training architecture that replicates the same types of systems and challenges. The Army and Joint communities need a Joint assessment/evaluation team to, “solidify combat training and readiness” during peacetime.

The third key point is that there are Army AMD units in Korea and Europe and they need to be incorporated into the branch’s training and assessment architecture. In the event of war defense design planners, communications experts and numerous other resources should include these theaters in efforts to prepare for war. Army AMD teams deployed to validate readiness may cut across Regional Combatant Command lines, but the assessments need to be presented in terms of the benefits to the Joint Force Commander. Assessments can be tailored to accommodate theater specific TTPs in the case of South Korea, but South Korea is a unique case study. Priority of effort should focus on training and assessing the CONUS and European Army and JTAMD forces to reinforce Joint TTPs and identify potential fault-lines in the JTAMD system.

The anticipated second and third order effects are varied. The Army will be forced to pull resources from within its branch manpower structure to man a branch ORE team. The

⁵² Ibid, 4-7

⁵³ Ibid, 6

positive return across the branch makes it worth the cost. De-linking CONUS Army AMD forces from Corps missions will facilitate unity of effort needed to address standards across the force and incorporate units into Joint and Army AMD training exercises in accordance with timelines and priorities established by the branch. In an environment in which funding resources are disbursed along service lines this may result in significant budgetary pain, however Army AMD will have to demonstrate a valid need for the resource dollars and infrastructure, and that will involve a very critical self-analysis.

DOCTRINE

Prior to Operation Desert Thunder, (February 1998-May 1998), “little approved doctrine existed to guide 32d AAMDC personnel in the execution of Army, joint and combined JTAMD operations.”⁵⁴ Significant strides have been made since Operation Desert Thunder, and there remains significant work to be done in defining and routinizing procedures and concepts for JTAMD. The Army AMD Concept and Operational and Organizational (O&O) plan notes, “new doctrine must be developed for employing AAMDCs and tailored AMD formations to support simultaneous, distributed and non-contiguous operations within netted and distributed Joint C4ISR architecture.”⁵⁵ The O&O plan also emphasizes the need for Army AMD doctrine to seamlessly integrate with Joint doctrine. I believe that the key to getting at doctrine is through a robust training and assessment program that facilitates training, feedback, willingness to change, and willingness to adapt to evolving Joint and Army AMD procedures in an exceptionally complex environment. Frequency of training with Joint forces and depth of personal relationships will lead ultimately to a more Joint effort to define new TTPs and refine changes to existing TTPs. Doctrine will evolve resulting from training Jointly, as it should.

⁵⁴ Ibid, 9

⁵⁵ U.S. Department of the Army, TRADOC Pam 525-3-01.94 O&O Plan for U.S. Army Air and Missile Defense , Washington D.C.: U.S. Government Printing Office,(2004), 6-7

Leaders in the Army AMD do not understand Army doctrine or Joint doctrine very well as it pertains to JTAMD. Without excusing this, it may be important to determine methods by which Army AMD leaders can better learn and more rapidly apply TTPs, and a mindset that addresses complexity vice doctrinal recitation. As new AMD formations quickly evolve, the challenge remains to adapt to TTPs developed through Joint and Army AMD training which leaders themselves may not actually have taken part in. A great deal of the true expertise and knowledge in Army and JTAMD procedures resides in the minds of a relatively few. A lot of lessons learned from JSCIET/ASCIET, Roving Sands, Blue Flag and various other exercise and training events need to be shared across the branch. Communications challenges as an example, continue to plague Army AMD leaders, yet few of our leaders are familiar with the doctrinal applications of communications as this tremendous capability pertains to AMD. It represents a virtual center of gravity in terms of operational capability and our leaders still do not understand the fundamental capabilities and limitations at all levels, across the branch.

As I write this paper, Army AMD forces are participating in their first Joint Red Flag at Nellis Air Force Base. I think it should be a priority to develop a means of sharing observations and lessons learned across the community while the exercise is on-going, but more importantly to push that information out to the various school houses and centers for learning. The Army AMD and JTAMD communities must begin to view the Command and General Staff College (CGSC) as more than hindrance, rather as a source of primacy in terms of shaping future Joint operations. The future S3 and XOs form a captive audience for a period of ten months. Every effort needs to be made to place updated doctrinal references in their hands, to share lessons learned and observations, and to influence these future leaders to contribute to solving JTAMD challenges as they emerge and assume key leadership positions within the Army and JTAMD systems. Understanding that the resident instructors at CGSC cannot sustain relevancy due to their separation from the field environment implies an understanding and willingness on the part of the Ft Bliss community to export knowledge in the form of subject matter experts, and various

resources to ensure the students are properly trained on doctrine, branch priorities and thoroughly familiar with the issues relevant to the branch.

Army AMD recently released the OIF Lesson Learned via the Army AMD Lessons Learned web page, a significant step in the right direction.⁵⁶ It is instructive however to note, that the Army AMD Lessons Learned Web page and the OIF Lessons Learned were not released until January 2005, almost two years after the release of the *Operation Iraqi Freedom Theater and Missile Defense History*, a document which highlighted the accomplishments of the 32d AAMDC and Army and JTAMD in OIF. I think there is great value in sharing the successes of our branch in a timely manner. It contributes to esprit de corps and professional development. However, I think the focus of our efforts immediately after the war should be problem identification and widespread sharing of lessons learned to preclude recurrences. This process should also include leadership forums detailing shortcomings with the intent to insure thorough understanding by all branch leaders as well as to develop a comprehensive, cohesive strategy to resolve these lessons learned.

A centralized repository of data is a critical function that is also needed. An organization tasked to serve as ground zero for knowledge, lessons learned, up-to-date references, system fielding status and anomaly reports, requests for information, and the source from which AMD bulletins to the branch originate, would greatly enhance doctrinal development, and leader knowledge. There were several cases during OIF in which units deployed for combat with system limitations which resulted from various technological developments. The system limitations were known by a few subject matter experts responsible for managing technological advances, but these were not understood by tactical units themselves until units arrived on the battlefield. The strategic implications alone merit serious consideration for the development of a

⁵⁶ The ADA Lessons Learned website was formally established on 13 December 2004 in an effort to collect lesson learned from the field. However actual Lessons Learned were not received by students at the Command and General Staff College, January 2005. The web address is: ada.lessonslearned@us.army.mil

centralized repository of knowledge. In fact this organization should augment, or reside within the Operational Readiness Evaluation organization. Currently the TRADOC Systems Manager serves as the reference source for technological development status for systems within the branch. However, this effort is separate from efforts to collect and share lessons learned, or efforts to observe, assess and enforce units in the application of AMD TTPs.

A significant amount of the post-OIF effort to identify and address JTAMD issues is currently being handled through service initiatives. The Army-Air Force Warfighter Talks represent an ongoing effort to address Air and Missile Defense issues. These “talks” are chaired by an Air Force Lieutenant General and an Army Major General and have occurred frequently over several years, and reflect an effort between the two services to identify and resolve a variety of issues common to both services. In the case of the 2004 Army-Air Force Warfighter Talk, the stated purposes included:

- (1) To Provide and overview of near-term initiatives to improve Joint Air and Missile Defense operations based on the ground-to-air and air-to-ground fratricide events during OIF.
- (2) To Address principles related to development of the IAMD Joint Integrating Concept (JIC)⁵⁷

In an effort to complement the Warfighter talks, Army AMD leaders initiated the Tri-Service Working Group. The Tri-Service Working Group is comprised of representatives from the Joint community and focuses on Operational Risk Management, Combat Identification, Engagement Coordination and Communication, Airspace Control, and Situational Awareness issues that developed during OIF. It seeks to institutionalize Joint TTPs, Joint Training Methodologies, Joint Certification and the Enforcement of Joint Standards. The Tri-Service Working Group represents a significant effort to address the operational shortcomings within

⁵⁷ *Air and Missile Defense*, 2004 Army-Air Force Warfighter Talks Briefing, 18 November 2004

JTAMD. The Tri-Service Working Group also represents an effort on the part of the services to address Joint shortcomings from the services perspective in the absence of unified Joint forcing function from above. Key actions items are represented in focus areas such as, operational risk management (ORM), Combat ID, Engagement Coordination and Communications, Airspace Control, and Situational Awareness. Several issues addressed by this group are issues identified during Operation Desert Storm, and they remain to be resolved presumably from this bottom-up approach. Recommendations produced by this group are still constrained by service approval, and subject to budget and organizational resource constraints of those services, reflecting a lack of unity of effort at the Joint level in determining priorities and the directing, as well as resourcing, of priorities accordingly. The issue of training and distributing the Air Defense Artillery Fire Control Officer across the joint force represents a one example of a Tri-Service Working Group issue that represents a joint capability priority, but which is inhibited by service constraints. The ADAFCO serves a key responsibility integrating into joint command and control structures within the other services. The ADAFCO serves as the liaison between the Area Air Defense Commander (AADC) defensive counter air operations and land-based missile defense systems for engagement operations. In short, he is the single POC between Army AMD and the controlling authority. The role of the ADAFCO is particularly important given the incidences of fratricide during OIF and the extremely limited joint training opportunities in garrison. An ADAFCO training course has been successfully established but the Army has determined that ADAFCO slots will be filled from within the existing Army AMD force structure, forcing tradeoffs with implications to existing force structure and system capabilities in a joint environment. The effectiveness of the ADAFCO has the potential to positively influence each of the Tri Service Working Group focus areas identified above.⁵⁸ Without a Joint forcing function

⁵⁸ ADAFCO Training and Utilization appears as an issue within the Focus Area of Engagement Coordination and Control in the Tri-Service Working Group Briefing and during discussions with Army AMD representative to the Tri-Service Working Group.

efforts to achieve “seamless joint interdependence” consistent with guidance put forth by the Secretary of Defense and the Chief of Staff of the Army, will remain mired in service parochialism at the expense of joint synergism.

The bottom line is that a process exists to influence the development of doctrine. One aspect of this effort resides in the efforts and processes such as the Tri-Service Working Group and the Army-Air Force Warfighter Talks. The key requirements for the future involve increasing the frequency and breadth of training within the Army AMD and JTAMD systems and then sharing those observations rapidly. The pressing need at this point in time is to develop in field grade officers and commanders an appreciation for the application of doctrine with a METT-TC mindset in order to successfully manage complexity.

LEADERSHIP AND EDUCATION

A recent informal study of Army AMD Majors attending CGSC at Ft Leavenworth revealed students attending the class had been away from tactical operations and their tactical systems for periods of between three and five years. Twenty percent of the students had some Joint experience of one form or another prior to attending the class. Many of the students were very apprehensive because of an Army AMD initiative that called for ‘cross-fertilizing’ SHORAD and HIMAD officers. In other words, those officers with the majority of experience within SHORAD or Divisional ADA systems were to be reassigned into a Patriot assignment and vice versa. Additionally, these field grade officers associated success in their future in the Army AMD with service in positions as S3/XO in tactical AMD units, so discussion about filling staff positions within the Units of Execution (Ue) consistent with Army AMD Transformation initiatives met with immediate resistance. Additionally, despite ten months of attendance at CGSC, there was no formal preparation for these Army AMD Majors to assume their follow-on positions as battalion executive officers and/or operations officers. We were in the process of

setting these students up for failure. How do we arm these leaders for success within the Army AMD?

The goal for leader development should be the attainment of mastery, vice proficiency, and this implies a source of acknowledged masters. It involves extensive professional dialogue with the most tactically and technically competent leaders in the branch. The Army AMD branch has initiated efforts to augment CGSC instruction with guest speakers and informal Officer Professional Development Programs. While this represents a move in the right direction more is needed. The branch needs to effectively wage an Information Operations program incorporating briefings, recruiting techniques, and other technique designed to create the effect of arming field grade officers with knowledge and confidence before they depart CGSC. Every officer attending a professional education course should be issued an updated issue of Army and Joint reference manuals to include planning tools and examples of materials used by planners at numerous levels. Officers attending CGSC should be issued a portable version of select reference manuals and an accompanying CD with the same material. Professional dialogue should focus on reorienting officers to this material. The agenda of the course of instruction and informal OPDs should be developed in coordination with the instructor and senior AMD officer at Ft Leavenworth.

Army AMD leaders need to build depth in the organization and confidence among its junior leaders by selecting field grade officers to backfill key positions in the future. When field grade officers attend CGSC it is the right time to approach them and discuss their professional standing. These officers respect candor and deserve it. Officers should be encouraged to pursue non-command tracks in the interest of the Army, and the individual. This can be accomplished by identifying individuals and offering them opportunities for advanced education that will set them up for a key position, while at the same time providing them with a degree that will be of benefit to them. We don't recruit quality personnel while they are Majors for key positions as Lieutenant Colonels and Colonels. For example, an officer with only a fifty to sixty percent chance of being selected for command would be receptive to an offer from the branch to track

him/her along an acquisition oriented path that might include an offer of a Masters Degree in Operations Research, placement in staff position in the pentagon with the expectation that this officer would be in consideration for a position other than command, such as that of the TRADOC Systems Manager, or the Director of Combat Developments, two critical positions that really require several years preparation to fully appreciate the contribution they make to the branch. Positioning the officer at the Pentagon initiates relationships and familiarize the officer with the environment in which he/she will work when filling the billet in the future. The point is that officers will accept the realities of the current environment and actually seek to pursue a path that will allow them to be successful contributors to the branch if they are professionally approached and encouraged to seek a path that satisfies the Army's needs and their personal needs. With a little effort on the part of the branch leadership, predictability can be established for future key positions as well as for the officers themselves. Predictability and assurance that an officer will be able to contribute to the branch priorities will influence the majority of officers to consider an other-than-command track.

RECOMMENDATIONS

“Materiel superiority alone is not sufficient. Of greater importance is the development of doctrine, organizations, training and education, leaders and people that effectively take advantage of technology.”⁵⁹

JV 2020

Establish Training and Leadership Education Primacy

The fundamental requirement necessary to develop successful changes in the Army AMD system is a realization that primacy among the domains must shift resource support from pursuit of technological and materiel advances to one in which Training, Education and Leadership Development attain primacy. Robust training and leadership development reinforces trust and confidence in both the system’s capabilities and among members within the Joint community. Training and Leadership development must orient on the need to train for complexity as it relates to air and missile defense operations. As Lawrence Wilkerson noted in his article, *What Exactly is Jointness*, “one of the strangest paradoxes of human behavior is that people accustomed to studied routine must be capable of quick and decisive departure from that mindset to be repeatedly successful. Order must tend to chaos...in order to intuitively adapt, triumph and endure.”⁶⁰

Institute a Joint Oversight Authority with Joint Funding Source

Pursuit of true “seamless” Joint interdependence must start at the Joint level and requires several key elements. The first requirement is to establish unity of effort by identifying a single Joint oversight authority empowered and focused on developing Joint capabilities. Joint Forces Command integrates Joint capabilities and enhances and augments Combatant Commanders in

⁵⁹ “Joint Vision 2020 America’s Military-Preparing for Tomorrow”, *Joint Forces Quarterly*, (Summer 2000); 4

⁶⁰ Wilkerson, 66-7

their efforts to develop Joint capabilities. Joint Forces Command does not however, serve as the Joint oversight authority for managing the synchronization of service efforts to attain a synergistic Joint capability. The second requirement necessary to influence “seamless” Joint interdependence involves empowering the Joint oversight authority by creating a Joint funding source. Without a Joint funding source, the services will continue to resource service priorities vice Joint priorities designed to achieve Joint synergy. Proficiency in Joint operations is a function of training and leadership and relationships that are formed through frequent, robust Joint training exercises. Joint training exercises will be ineffective without a Joint Training and Evaluation structure designed to train, assess, and recommend changes and adjustments necessary to achieve and sustain Joint proficiency.

Unfortunately, while it is feasible that a Joint oversight authority could be appointed with authority to control a Joint funding source, and directly influence “Jointness”, it is unlikely that the Department of Defense would pursue this approach. It threatens the authority of Regional Combatant Commanders and Service Chief parochial projects. So, without an anticipated change how does the Army AMD pursue successful development of an Army AMD capability and synchronize that capability into the JTAMD system to achieve synergistic Joint capabilities?

Institute a Feedback Organization

The single most important action that needs to be implemented within the Army AMD environment is the establishment of a centralized standards-enforcement organization tasked with training, assessing and providing constant feedback and recommendations for change. Managing change in complex systems requires a constant feedback process and constant adjustments to manage systems. This organization needs to be populated by senior active duty soldiers who have demonstrated mastery in the Army AMD operations. While it can be augmented with contractor support personnel, the composition of the unit should not be dominated by contractors. The return on the investment will justify the infrastructure cost in soldiers if the organization is

manned by acknowledged masters within the branch. Responsibilities of this organization should include: (1) responsibility for retaining the most up-to-date references, manuals, and resources on Joint, Operational and Tactical procedures, Technical specifications, maintenance, logistics, communications (all Unit Level Logistics Systems reportable equipment); (2) responsibility for maintaining the repository for all Lessons Learned and information exchange websites; (3) responsibility for validating and tracking all hardware fielding configurations and software versions on all of systems that participate within the JTAMD system.; and (4) responsibility for validating training and evaluations. This unit should be responsible for certifying subordinate evaluation teams and should support Brigade Table XII certification efforts. This organization should target other highly proficient officers and enlisted soldiers within the branch and utilize their expertise as a member of combined team in a supervised role in assessing unit training readiness. Each Brigade should also have an LNO attached to the organization in order to share observations and provide recommendations. This organization is critical to the forward moving progress of the branch. Members of this team will also represent the Army AMD as members of a Joint Assessment team tasked to observe and critique Joint Training.

Institute a Formal Joint/Operational and Tactical Training and Evaluation Process

Consistent with the previous recommendation there is a clear need for a robust, structured Training and Evaluation process at both Joint/operational and tactical levels. Training exercises at both levels require expert observers who have demonstrated mastery in their profession. Exercises need to maximize simulation capabilities with emphasis on replicating the complexity of the battlefield. The most important aspect of this exercise process is that the frequency of exercises accommodates every tactical unit in the JTAMD system at least once during the year. Battery level commanders must participate from a deployed field location with a Battalion, Brigade, 32d AAMDC and Combined Air Operations Center participating simultaneously. Given

some of the challenges demonstrated during OIF I think a quarterly Joint Red Flag-like exercise is not only justified, but necessary.

Centralize Command and Control of all Army AMD brigades on Ft Bliss

Within the Army Air and Missile Defense, clear goal setting needs to begin by establishing unity of effort within the Army AMD community, and there is an opportunity to accomplish this utilizing historical precedent. First, the Army needs to recognize the unique, inherently Joint Army AMD mission set and authorize the release of Corps AMD units back to the Army AMD community. The Army AMD should consider retaining direct control of all Army AMD brigades that are located on Ft Bliss with the goal of clarifying Joint goals and establishing clearly understood standards, expectations and mastery in Army AMD operations.

CONCLUSION

The current transformation of the Army is more inward-looking than outward looking. Its major focus is on deployability and survivability. It does not emphasize the deficiencies in Jointness that have become apparent over the last decade.”⁶¹

Bernard Rotsker,

Transformation and the Unfinished Business of Jointness

Each of the services endures challenges similar to those experienced by the Army AMD as each attempts to develop Joint capabilities within a framework in which resource funding is disbursed along service lines. Change at the highest levels is unlikely, in the absence of a catastrophic event in Joint operations and this amounts to strategic risk assessment. If the risk in terms of fratricide is acceptable then the cost of doing business in the Joint community will remain unchanged.

⁶¹ Rotsker, 147

Regardless of the service, there is a need to apply Doerner's principles to the processes within the various services in order to effectively manage the complexity that is the service AMD system within the JATMD system. Key to pursuing any efforts to implement a system designed to achieve improved AMD capabilities is the requirement to understand the reciprocal interrelationship among key variables. Additionally, the absence of clear goals, or the reliance on poorly defined goals breeds confusion within the inter-relationships of variables, frustrates participants attendant to the system and contributes significantly to the likelihood of failure. Efforts to progress towards improved JTAMD capabilities must also overcome the inherent tendency of many service systems which over-emphasize aspects of success in victory or default to repair service behavior during crisis, at the risk of failure, due to an inability or unwillingness to focus on deficiencies and their systemic origins. Army AMD systems challenges are similar to those experienced by the other services in attempting to develop Joint capabilities within those service-parochial systems. The challenge remains to seek to manage complexity within each service's own systems in order to improve air and missile defense capabilities at more than one level. Despite the lack of a Joint oversight authority and competition for resources with other Army Transformation priorities, the Army AMD is capable of implementing systemic changes necessary to influence significant progress in developing its own AMD capabilities and successfully integrate into the JATMD system.

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